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GUIDE FOR TANNIN BEARING PLANTS

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GUIDE FOR TANNIN BEARING PLANTS

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(*Continued on page* 2)

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Indian Standard
GUIDE FOR TANNIN BEARING PLANTS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 10 August 1982, after the draft finalized by the Tanning Materials and Allied Products Sectional Committee had been approved by the Chemical Division Council.

0.2 This guide lists various tannin bearing plants available in India to explore the possibility of identifying new sources of tannins. The Forest Research Institute and Colleges, Dehra Dun and the Botanical Survey of India, Calcutta have assisted in compiling the list given in this guide.

0.3 The properties of tanning material greatly affect the quality of leather. An astringent tanning material tends to produce hard and harsh leather. Leaching of vegetable tannin material at a temperature above 60°C destroys natural enzymes which produce ellagic acid and other non-tannins in liquors; decrease in the mellowness of the liquor results thereby. Pyrogallol tannins are less astringent than catechol tannins because of their higher sugar content and ready solubility. Acidic non-tannins are even better producers of mellowness when present as salts; they are also good *p*H buffers. Liquors made from catechol tannins are likely to be poorly buffered. Thus astringency and mellowness vary in opposite directions with the class of tannins catechol or pyrogallol, its tannin and non-tannin ratio, ease in solubility, buffering, etc, and all these factors have to be taken into account in assessing a tanning material. While an astringent tanning material is desirable from the commercial point of view to get quick results, a less astringent one is desirable if mellow tanning liquors to produce high class, tough, strong and pliable leather are required. Dry storage conditions are essential for tanning materials, because dampness assists oxidation of the tannin and encourages the growth of fungus, moulds, etc.

1. SCOPE

1.1 This guide lists various tannin bearing plants available in India which are used for tanning purposes. This does not cover application of these tan stuffs in production of chemicals like oxalic acid, etc, and other than vegetable tanning extracts either singly or in blends.

2. TERMINOLOGY

2.1 For the purpose of this guide the definitions given in IS : 1640-1960* shall apply.

3. CLASSIFICATION

3.1 The tannin bearing plants have been listed in Table 1. Information pertaining to their family, distribution, parts used for tannin extract, and content and type of tannin along with their utilization have been included in the table.

4. COLLECTION, STORAGE AND TRANSPORTATION OF VEGETABLE TANNING MATERIALS

4.1 A note giving available information relating to collection, storage and transportation of commonly used vegetable tanning materials is given in Appendix A.

APPENDIX A

(*Clause* 4.1)

NOTE ON COLLECTION, STORAGE AND TRANSPORTATION OF VEGETABLE TANNING MATERIALS

A-1. MYROBALANS

A-1.1 Collection

A-1.1.1 The fruit nuts of myrobalan trees are normally picked up by the local inhabitants during December to March. Sometimes, the collectors resort to shaking and lopping of the branches to collect the fruits. The fruits which normally fall down are ripen and the ones collected by lopping may still be un-matured. The nuts are then dried under shade, and at times by fumigation in their huts. No grading is normally done by the primary collectors. After drying, the primary collectors sell the material to various contractors and their middlemen who maintain way-side depots in various forest areas. These dealers dry them further if necessary, and grade them as First, Second and Third Grade in some areas; and as J-I, J-II, J-III in Madhya Pradesh. The First Grade nuts are free from insect attack and sound in structure. Second Grade are somewhat darker in shade and smaller in size and Third Grade nuts are normally composed of those affected by insects and those which float in water.

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*Glossary of terms relating to hides, skins and leather.

A-1.2 Storage

A-1.2.1 The storage of nuts is normally in thatched sheds at the dealers' level and at times even in open space, exposing them to the risk of occasional shower of rains. But the main contractors do maintain *pucca* godowns for the storage of the nuts. These are packed in old gunny bags weighing about 75 kg each.

A-1.3 Transportation

A-1.3.1 Regarding transportation, the primary collectors always carry the material by head-load, the village agents or middlemen, carry them either by donkey-loads or cart-loads to the main contractors' depots. The main contractors transport the material normally by lorry loads.

A-2. WATTLE BARK

A-2.1 Collection

A-2.1.1 The bark of wattle trees is stripped from main trunk and thick branches in strips of 90 cm length and 7·5-10 cm width. They are then packed into about 10-15 kg bundles in green condition and transported by lorry loads to the extract factories or to the dealers' godowns. In the case of extract factories, the bark is not further dried but used as such in machines that are specially made for the purpose of crushing. In case of dealers, the strips are further dried under shade and at times in open to bring the moisture from about 40-50 percent to about 12-15 percent. They are then chopped/cut into pieces of 100-150 mm in length and 75-100 mm width. They are then put in old gunny bags weighing about 125 kg and then stored in *pucca* godowns.

A-3. OTHER BARKS

A-3.1 Similar methods of collection, storage and transportation are also employed for other barks, such as *babul*, *goran*, *sonali* and *sal*. The collection of these barks is normally done by local inhabitants. In forest areas, the barks are stripped from the standing trees from their main trunk. In such operations the trees naturally die and there is no regeneration of barks. In some cases the trees are felled and the barks stripped out, and then dried and cut into pieces. Transportation of these barks from the forest areas to the dealers' godowns is done by head loads or cartloads. The barks are cut into strips of small pieces only at the dealers' places after drying and then transported by lorry loads to the consumers.

A-3.2 For Avaram bark, the shrub is cut to about 50 mm from the ground level and the stems are beaten up by wooden hammers to loosen the bark from the wood. The bark is then peeled off, dried in sun or shade and chopped down to small pieces. The Avaram bark is normally very thin. Storage and transportation are almost similar to the one described in **A-1.2** and **A-1.3**.

A-3.3 For Cashew testa, the cashew nuts may or may not be roasted. In either case, the nuts are broken open by hand shelling and the kernels are separated from the shells. The testa, that just covers the kernels is peeled off by hands mostly by women labourers. The testa is then left in open space for a few days for drying and then packed in old gunny bags weighing 30 kg each. As the Cashew testa is mostly obtained from Cashew processing factories, the transportation is directly done by lorry loads to the consumers.

TABLE 1 TANNIN BEARING PLANTS

(*Clause* 3.1)

Sl No.	Botanical Name of Plant	Distribution	Part Used for Tanning/ Extract Manufacture	Tannin Content, Percent by Mass*	Tannin/ Non-Tannin Ratio	Type of Tannin	Utilization	
							In Tanning Industry	Other Industries
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	*Acacia catechu* (*Khair*)	Assam, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh, West Bengal	Heart wood	10·0	2·0	Condensed	Cutch is used for tanning and dyeing	Also used in oil drilling opera-tions and for the manufacture of *Kattha*
2.	*Acacia leueophloea*	Jammu & Kashmir, Madhya Pradesh, Punjab, South India, Uttar Pradesh	Bark	17	1·5	do	Bark is used in tanning and can also be used in mixture with *Cassia fistula*	Pods are used as cattle fodder
3.	*Acacia mollissima* Wild (Waggle)	Kodai hills, Nilgiris, South India	do	30–35	2·5	do	Used particularly for sole leather manufacture and also for East India (E.I.) and light leathers	—
4.	*Acacia nilotica* (*SSP*) *indica* (*Babul*, arabica)	Throughout India	do	12–18	1·5	do	Used for heavy leather and also supplemented by myrobalan for sole leather	—
5.	*Anogeissus latifolia* Wall. (*Dhawa*, *Bakli*)	Throughout Sub-Himalayan tract, Madhya Pradesh, South India	i) Mature leaves	16–18	1·2	Hydrolyzable	Leaves are used alone and in admixtures with *Zizyphuxy lophorus* or myrobalans by village tanners	—
			ii) Young leaves	30–32	1·5	do		
6.	*Anacardium occidentale* Linn. (Cashew nut)	Andhra Pradesh, Coastal forests, Kanara District of Karnataka, Kerala, North Kanara District, Ratnagiri, Tamil Nadu, West Coast	Testa	23	2·0	Condensed	Used extensively in extract manufacture and in blended extracts	—
7.	*Areca catechu* Linn. (Supari)	Assam, Madras, Mysore, Southern Maharashtra, West Bengal	i) Nut	15	1·0	do	Rarely used in tanning	Nut used for chewing
			ii) Rind	5	0·8		do	—
8.	*Bridelia retusa* Spreng (Khaja)	Throughout India	—	20·0	2·0	do	Rarely used in tanning	—

*Moisture 8 to 10 percent by mass.

(*Continued*)

TABLE 1 TANNIN BEARING PLANTS — *Contd*

Sl No. (1)	Botanical Name of Plant (2)	Distribution (3)	Part Used for Tanning/ Extract Manufacture (4)	Tannin Content, Percent by Mass* (5)	Tannin/ Non-Tannin Ratio (6)	Type of Tannn (7)	Utilization	
							In Tanning Industry (8)	Other Industries (9)
9.	*Cassia auriculate* Linn. (*Avaram*)	Gujarat, Maharashtra, South India	Bark	18	1·5	Condensed	Highly favoured in tanning of E.I. skins mainly because of its tanning and colour properties	—
10.	*Caesalpinia coriaria* Linn. (Divi-Divi)	Maharashtra, Tamil Nadu	Pods	38	1·2	Hydrolyzable	Used in the manufacture of leather, but not alone as the leather thus produced is strongly affected by atmospheric conditions It is blended with other tanning material. It is also used in the manufacture of heavy leather dusting in layers	—
11.	*Cassia fistula* Linn. (*Konnai, amaltas*)	Throughout India	Bark	9–12	1·2	Condensed	Bark is used as a diluent for avaram in tanning	—
12.	*Casuarina equisetifolia*, Linn.	Andamans, Orissa, South India	do	7–8	1·2	do	—	Used mainly for treating fishing nets
13.	*Ceriops roxburghiana* (mangrove)	Andamans, Coastal forests of South India, Sunderbans in West Bengal	do	20–30	2·2	do	Used as a rapid diffuser into hides and skins	—
14.	*Ceriops tagal* (Goran)	Tamil Nadu, West Bengal	do	40·0	2·5	do	Used in West Bengal tanneries for sole leather	Used in blend extracts
15.	*Cleistanthus collinus.* Roxb. (Karoda)	Bihar, Himachal Pradesh, Madhya Pradesh, Orissa, Tamil Nadu	do	25	2·0	do	Imparts reddish colour to leather	—
16.	*Diospyros melanoxylon* Roxb. (Tendu)	Bihar, Madhya Pradesh, West Penisula	Fruits	20·0	0·8	Hydrolyzable	Seldom used in tanning	—

*Moisture 8 to 10 percent by mass.

(*Continued*)

TABLE 1 TANNIN BEARING PLANTS — *Contd*

SL No.	BOTANICAL NAME OF PLANT	DISTRIBUTION	PART USED FOR TANNING/ EXTRACT MANUFACTURE	TANNIN CONTENT, PERCENT BY MASS*	TANNIN/ NON-TANNIN RATIO	TYPE OF TANNIN	UTILIZATION	
							In Tanning Industry	Other Industries
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
17.	*Emblica officinalis* Caertn. (Ambla, Anola)	South India	Leaves	21–26	2·0	Hydrylyzable	Leaves are used for tanning. Twigs and bark can also be used	—
18.	*Eucalyptus globulus*	Throughout India	Bark	12–14	1·2	Catechol	Not found in commercial quantities	Many hybrids are planted
19.	*Hopea parvillora* Bedd. (Konju)	Karnataka (South Kanara), Kerala	do	21	1·5	Condensed	Used rarely. Very astringent tannin material with slow speed of diffusion	—
20.	*Peltophorum ferrugineum* Benth	Andamans	Matured Bark	20·0	1·8	do	Used rarely in tanning	—
21.	*Pithecolobium dulce* Benth	Andamans and South India	Bark	34·0	2·0	do	do	—
22.	*Punica granatum* Linn. (Pomegranate/Dhalim)	Jammu & Kashmir	Rind	15·0	1·5	do	Used in village tanning	Bark also contains tannin
23.	*Shorea robusta* Gaertn. (Sal)	Throughout India	Bark	7–9	1·2	do	Bark-tannin is used myrobalan or other tanning mixtures. Imparts reddish colour	—
24.	*Terminalia arjuna* Bedd. (Arjuna)	Maharashtra, Madhya Pradesh, Orissa, South India	do	23	2·0	do	Used both by itself and in combination with babul	—
25.	*T. Chebula* Retz. (Myrobalan)	Throughout India	do	25–35	2·5	Hydrolyzable	Used in mixture with other tanning materials. Major tannin extract produced in India. Myrobalan is not very astringent and does not penetrate the hide very rapidly	Also used in ink and for dyeing

*Moisture 8 to 10 percent by mass.

(*Continued*)

TABLE 1 TANNIN BEARING PLANTS — *Contd*

SL No.	BOTANICAL NAME OF PLANT	DISTRIBUTION	PART USED FOR TANNING/ EXTRACT MANUFACTURE	TANNIN CONTENT, PERCENT BY MASS*	TANNIN/ NON-TANNIN RATIO	TYPE OF TANNIN	UTILIZATION	
							In Tanning Industry	Other Industries
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
26.	*T. bellerica* Roxb. (Gaertn.) (Bahera)	Throughout India	Nut	25·0	2·0	Hydrolyzable	Belerio myrobalan is sometimes used by village tanneries in India in place of the better chebulic myrobalan	—
27.	*T. paniculata* Roth	Tamil Nadu	Bark	14·0	1·5	—	—	—
28.	*T. tomentosa* (Sain ain, soja)	Throughout India	do	15	1·5	Condensed	Bark is occasionaly used in the large tanneries	—
29.	*Querous incana* Roxb. (Oak)	Himalayan tract	do	6–10	1·5	do	Leather manufacture	—
30.	*Rhizophora mucronata* (Black mangrove)	Andamans, West Bengal (Sunderbans) and near the sea	do	30	2·0	do	do	—
31.	*Woodfordia fruiticosa* (Kurz, dhai)	Throughout India	Flowers	20·0	2·0	do	Seldom used	Bark also contains tannin
32.	*Ziziphus xylopyrus* Walld (Gothar)	Northern India	Fruits	2·0	2·0	Mixed type	Used as principal tanning material for tanning hides and skins	Fruit is also used for dyeing

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*Moisture 8 to 10 percent by mass.